

the high liquid level probes are contacted by the fluid and for which time delay relay R3 provided opportunity to complete operates as follows. Upon the closing of relay R1 contacts 44 and 45 and through relay R10 normally closed contacts 81 and 82, solenoid valve S2 is energized. Solenoid valve S2 connects secondary sampler 120 with vacuum pump 110 by means of lines 112 and 111 respectively (FIG. 1). The sample is withdrawn from sampling tube 10 through fritted glass tube 21 attached to tube 20 extending longitudinally into sampling tube 10 from the top most end, through line 22 into controller 41 and thereafter line 121 to secondary sampler 120. The fluid is drawn into secondary sampler 120 until the desired amount is obtained as indicated by level sensing probes 121 and 122 which sense the level of the fluid causing sensing transformer T3 to produce an output. The output of T3 energizes relay R10 causing normally closed contacts 81 and 82 to open which in turn causes solenoid valve S2 to cease withdrawal of the fluid from sampling tube 10 into the secondary sampler 120.

The secondary sampling circuit then goes into a quiescent or dormant state until time delay relay R3, which permitted time for the withdrawal of the sample, has had its time period expire. At the expiration of the time period, contacts 54 and 55 close permitting the energization of relay R2 and closing of normally open contacts 49 and 50. Solenoid valves S3 and S4 are then energized as is the electrode wash circuit which will be explained later.

Solenoid valve S3 supplies air pressure to secondary sampler 120 by means of air lines 101 and 102. Solenoid valve S4 is merely an open-shut valve connected to sample withdrawal line 126 which permits the sample to be forced out of secondary sampler by air pressure to a field sample depository 130 through line 127. The operations of solenoid valve S3 and S4 are terminated when the relay R2 goes back into its normal unenergized state. The secondary sampling operation is then complete and is utilized again in the same sequential operation as described above.

The electrode wash circuit means provides for washing the ion sensing probe 19, and if desired, the sample removing apparatus 20 and 21, and the liquid level sensing probes 16, 17 and 18. It consists of apparatus 23 to spray the above listed apparatus within sampling tube 10 with an appropriate wash.

The electrode wash circuit comprises relay R16 which is energized through relay R2 contacts 49 and 50 when relay R2 itself is energized, such time being the time when the fluid in the sampling tube has risen to its top most position, the sample has been withdrawn and the fluid has just started to be ejected from the sampling tube 10. At that time, solenoid valves S11 and S10, which valves are connected in series in the line prior to the spray head fixture, open and permit the wash spraying of the contained apparatus. Time delay relay R16 times the wash period and upon the expiration of the selected time period, nominally five to ten seconds, the normally closed contacts 91 and 92 open which close solenoid valve S11 and shut off the flow of wash fluid therethrough. Solenoid valve S10, in series with S11, remains open throughout the period of time that relay R2 remains energized, which is the period of time that air pressure is clearing the sampling tube 10. Solenoid valve S10 returns to its normally closed state as relay R2 de-energizes.

While a preferred embodiment has been shown and described, it will be understood that there is no intent to limit the invention by such disclosure but, rather, it is intended to cover all modification and alternate constructions falling within the spirit and scope of the invention as defined in the appended claims.

What is claimed is:

1. A device for sampling fluids, mixtures of fluids and solids, and emulsions comprising sampling tube means communicating with a fluid, mixture of fluid and solids, or emulsion in an associated container, and controller means operably connected to said sampling tube means, said sampling tube means including a vertically positioned elongated, cylindrical tube enclosed at said upper end having located interiorly therein means for detecting the characteristics of the fluid, mixture of fluids and solids, and emulsions, and means for sensing the level of the fluid, mixture of fluids and solids, and emulsions therein, and pneumatic line means operably connected to said sampling tube enclosed end; said fluid, mixture of fluids and solids, and emulsion level sensing means and characteristic detection means and said pneumatic line means operably connected to said controller means; and said controller means having regulatory controlling means to regulate said fluid, mixture of fluids and solids, and emulsions entering said sampling tube lower end, to detect characteristics of a sample of said fluid, mixture of fluids and solids, and emulsions, to expel said fluids, mixture of fluids and solids, and emulsions from said sampling tube, and to recycle said sequence.

2. The device for sampling fluids, mixtures of fluids and solids, and emulsions as defined in claim 1 wherein said fluid, mixtures of fluids and solids, and emulsion level sensing means comprises low level sensing means in proximity said sampling tube lower end and high level sensing means in proximity said sampling tube upper end.

3. The device for sampling fluids, mixtures of fluids and solids, and emulsions as defined in claim 2 wherein said means for detecting characteristics of said fluid, mixture of fluids and solids, and emulsions comprises ion sensing means.

4. The device for sampling fluids, mixtures of fluids and solids, and emulsions as defined in claim 3 wherein said controller means regulatory controlling means includes means having an adjustable orifice therein whereby the air entrapped in said sampling tube may be bled off permitting said fluid, mixture of fluid and solids and emulsions to enter said sampling tube lower most end at a controllable rate, means for receiving the output of said level sensing means comprising sensing transformers operably connected to said low level and high level sensing means whereby said sensing transformer indicates an output when the level is sensed, and means for operably delaying said sampling operation to permit detection of said fluid, mixture of fluids and solids and emulsion characteristics.

5. The device for sampling fluids, mixtures of fluids and solids, and emulsions as defined in claim 4 further comprising means for removing a sample of the fluid, mixture of fluids and solids, and emulsions from said sampling tube, secondary sampler means for receiving said sample removed, means for sensing the level of said sample within said sample receiving means, means for removing said sample from said sample receiving